BOUNDARY-LAYER METEOROLOGY
Vol. 41 Nos. 1–4 October–December 1987

INTERACTIONS BETWEEN ENERGY TRANSFORMATIONS AND ATMOSPHERIC PHENOMENA. A SURVEY OF RECENT RESEARCH.

Guest Editors

MARTIN BENISTON
Ecole Polytechnique Fédérale de Lausanne, Switzerland

and

ROGER A. PIELKE
Department of Atmospheric Science, Colorado State University, Fort Collins, U.S.A.

MARTIN BENISTON and ROGER A. PIELKE / Foreword vii

PART 1
RESPONSE OF THE ATMOSPHERE TO WASTE-HEAT RELEASE

DANIEL A. SCHNEITER / Meteorological Impacts of the Cooling Tower of the Goesgen Nuclear Power Plant 3

J.-M. GIOVANNONI / A Laboratory Analysis of Free Convection Enhanced by a Heat Island in a Calm and Stratified Environment 9

J. JOSS and G. RESELE / Mathematical Modelling of the Heat Exchange Between a River and the Atmosphere 27

MIAO MANQIAN / Numerical Modeling of the Nocturnal PBL over the Urban Heat Island in Changzhou City 41

PART 2
MESOSCALE PROCESSES NUMERICAL MODELING, PHYSICAL MODELING OBSERVATIONS

R. A. PIELKE, R. W. ARRITT, M. SEGAL, M. D. MORAN, and R. T. McNIDER / Mesoscale Numerical Modeling of Pollutant Transport in Complex Terrain 59

MARTIN BENISTON / A Numerical Study of Atmospheric Pollution over Complex Terrain in Switzerland 75

B. W. GOLDING / The U.K. Meteorological Office Mesoscale Model 97

F. SCHUBIGER, G. DE MORSIER, and H. C. DAVIES / Numerical Studies of Mesoscale Motion in a Mixed Layer over the Northern Alpine Foreland 109

H. M. APSIMON and J. J. N. WILSON / Modelling Atmospheric Dispersal of the Chernobyl Release Across Europe 123

TH. FLASSAK, and N. MOUSSIOPOULOS / An Application of an Efficient Non-Hydrostatic Mesoscale Model 135

JOHN J. CARROLL, LUIS R-MENDEZ-NUÑEZ, and SAFFET TANRIKULU / Accurate Pressure Gradient Calculations in Hydrostatic Atmospheric Models 149

PART 3
ATMOSPHERIC DISPERSION NUMERICAL MODELING, PHYSICAL MODELING, OBSERVATIONS

N. E. BUSCH, S. E. GRYNING, N. O. JENSEN, and I. TROEN / Turbulence and Diffusion over Inhomogeneous Terrain 173

A. C. M. BELJAARS, J. L. WALMSLEY, and P. A. TAYLER / Modelling of Turbulence over Low Hills and Varying Surface Roughness 203

TOSHIHIRO KITADA / Turbulence Structure of Sea Breeze Front and its Implication in Air Pollution Transport – Application of k-ϵ Turbulence Model 217

M. SCHATZMANN, G. KÖNIG, and O. A. LOHMEYER / Wind Tunnel Modeling of Small-Scale Meteorological Processes 241

N. MOUSSIOPOULOS / A New Technique for the Solution of Diffusion Equation Systems for Reacting Pollutants 251

G. PETERSEN, D. EPPEL, and H. GRASSL / Verification of the Pollutant Transport Model 'MODIS' Using EPRI Plains Site Data from a Tall Stack 265

R. TOUZANI / Finite Element Computation of Pollutant Transport in Thermally Stratified Flows 279

NADEŽDA ŠINIK and EDITA LONČAR / Eddy Energy Dissipation Rate and Puff Diffusion During Calms 287

F. GASSMANN, and D. BÜRKI / Experimental Investigation of Atmospheric Dispersion over the Swiss Plain – Experiment 'Siesta' 295

S. E. GRYNING, S. JOFFRE, and J. C. DORAN / The Øresund Experiment – Wind and Temperature Structure over a Land-Water-Land Area 309

T. C. SPANGLER and A. J. SCHANOT / A Standing Wave in Stable Drainage Flow Induced by a Small Industrial Facility 319

PART 4
MICROPHYSICS AND CHEMISTRY RELATED TO AIR POLLUTION

S. TWOMEY, R. GALL, and M. LEUTHOLD / Pollution and Cloud Reflectance 335

K. Ya. KONDRATYEV and V. I. BINENKO / Optical Properties of Dirty Clouds 349

N. CHAUMERLIAC and R. ROSSET / Pollutant Scavening in a Mesoscale Meteorological Model with Quasi-Spectral Microphysics 355

L. T. KHEMANI, G. A. MOMIN, and MEDHA S. NAIK / Influence of Atmospheric Pollutants on Cloud Microphysics and Rainfall 367

ROGER F. REINKING / Perspectives for Research in Wet Chemistry and Unintentional Cloud Modification from the Discipline of Purposeful Cloud Modification 381

GEORGE D. DJOLOV, DIMITAR L. YORDANOV, and DIMITAR E. SYRAKOV / Modelling the Long-Range Transport of Air Pollutants with Atmospheric Boundary Layer Chemistry 407

P. J. H. BUILTJES and A. M. TALMON / Macro- and Micro-Scale Mixing in Chemical Reactive Plumes 417